RFP 1325 02 (REV 5/97)
Previously RF-46522

CORRES CONTROL
INCOMING LTR NO
01480 RF 97

DUE DATE
ACTION

Department of Energy

ROCKY FLATS FIELD OFFICE
P O BOX 928
GOLDEN COLORADO 80402-0928

6 OCT 97 10:2

RFETS-CC-

97-DOE-053

DIST	LTR	ENC
BACON, R.F.		
BENSUSSEN, S.J.		
BORMOLINI, A.M.		
BRAILSFORD, M.D		
BUHL, T.R.		
BURDGE, L		
CARD, R.G.		
COSGROVE, M.M.		
COULTER, W.L.		
CRAWFORD, A.C.		
DERBY, S.		
DIETERLE, S.E.		
FERRERA, D.W.		
GERMAIN, A.L.		
HARDING, W.A.		
HARROUN, W.P.		
HEDAHL, T.G.		
HERRING, C.L.		
HILL, J.A.		
MARTINEZ, L.A.		
NORTH, K.		
OGG, R.N.		
PARKER, A.		
PHILLIPS, F.J.	X	X
RHOADES, D.W.		
RUSCITTO, D.G.		
SANDLIN, N.B.		
SPEARS, M.S.		
TILLER, R. E.		
TUOR, N.R.		
VOORHEIS, G.M.		
Slaton, S	X	X
Eaton, S	X	
Fitch, W	X	
COR CONTROL	X	X
[redacted]		
PATS/T130G		

Reviewed for Addressee
Corres Control RFP

10/6/97 SK
Date By

Ref Ltr #

DOE ORDER # 4700.1

Mr. Steve Tarlton
RFCA Coordinator
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Dear Mr Tarlton

This letter forwards two documents for your consideration:

- Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites 121 and 148 at Building 123, and
- Closure Plan for Building 123 Components of RCRA Unit 40.

Each of these documents requires approval from the Colorado Department of Public Health and Environment before execution The Closure Plan will be subject to public comment prior to approval

If you have any questions, please call William Fitch at 966-4013

Sincerely,

Steven W. Slaten
RFCA Coordinator

Enclosures

ADMIN RECORD
B123-A-000018

Rocky Mountain
Remediation Services, L L C.
protecting the environment

RF/RMRS-97-023

Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites (IHSS) 121 and 148 at Building 123

Rocky Flats Environmental Technology Site

Prepared by

Rocky Mountain Remediation Services, L. L. C

September 1997

TABLE OF CONTENTS

TABLE OF CONTENTS (cont)

ACRONYMS

Am	americium
Be	beryllium
BTEX	benzene, toluene, ethylbenzene, and xylenes
$C_2H_4O_2$	acetic acid
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Cm	curium
DQO	Data Quality Objective
DOE	Department of Energy
EMD	Environmental Management Department
EPA	Environmental Protection Agency
ER	Environmental Restoration
FID	Flame Ionization Detector
FO	Field Operations
GIS	Geographical Information System
GPS	Global Positioning System
HNO_3	nitric acid
HCl	hydrochloric acid
$HClO_4$	perchloric acid
HF	hydrofluoric acid
HPGe	high-purity germanium
H_2SO_4	sulfuric acid
IHSS	Individual Hazardous Substance Site
NaOH	sodium hydroxide
NH_4OH	ammonium hydroxide
OPWL	Original Process Waste Line
OU	Operable Unit
PAC	Potential Area of Contamination
PAM	Proposed Action Memorandum
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	Photo Ionization Detector
Pu	plutonium
QA/QC	Quality Assurance/Quality Control
QAPD	Quality Assurance Program Description
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RFCA	Rocky Flats Cleanup Agreement
RFEDS	Rocky Flats Database System
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RMRS	Rocky Mountain Remediation Services
SOPs	Standard Operating Procedures
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Report
TAL	Target Analyte List
TCFM	trichlorofluoromethane
TCL	Target Compound List

ACRONYMS (Cont)

TOC	total organic carbon
U	uranium
UBC	under building contamination
VOC	volatile organic compound

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs)

Identification Number	Procedure Title
2-G18-ER-ADM-17 01	*Records Capture and Transmittal*
2-G32-ER-ADM-08 02	*Evaluation of ERM Data for Usability in Final Reports*
2-S47-ER-ADM-05 15	*Use of Field Logbooks and Forms*
5-21000-OPS-FO 03	*General Equipment Decontamination, Section 5 3 1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field*
5-21000-OPS-FO 06	*Handling of Personal Protective Equipment*
5-21000-OPS-FO 10	*Receiving, Labeling, and Handling Environmental Containers*
5-21000-OPS-FO 13	*Containerization, Preserving, Handling and Shipping of Soil and Water Samples*
5-21000-OPS-FO 15	*Photoionization Detectors and Flame Ionization Detectors*
5-21000-ER-OPS-GT 01	*Logging Alluvial and Bedrock Material*
5-21000-ER-OPS-GT 39	*Push Subsurface Soil Sampling*
4-U50-REP-1006	*Radiological Characterization of Bulk or Volume Materials*

SOIL SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSS) 121 AND 148 AT BUILDING 123

1.0 INTRODUCTION

1 1 Purpose

The purpose of this document is to provide a Sampling and Analysis Plan (SAP) for the characterization of soils underlying and surrounding Building 123, with respect to the Rocky Flats Cleanup Agreement (RFCA) and pursuant to the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) The goal of the field investigation is to provide the data necessary to support the decontamination and demolition of Building 123 and fulfill criteria defined by the *Proposed Action Memorandum (PAM) for the Decommissioning of Building 123* (RMRS 1997a)

The objective of the SAP is to define specific data needs, sampling and analysis requirements, data handling procedures, and associated Quality Assurance/Quality Control (QA/QC) requirements for this project All work will be performed in accordance with the RMRS Quality Assurance Program Description (QAPD) (RMRS 1997b)

1.2 Background

Building 123 is located on Central Avenue between Third and Fourth Streets at the Rocky Flats Environmental Technology Site (RFETS, Figure 1 1) The Building 123 Area encompasses overlapping Individual Hazardous Substance Sites (IHSSs) 121 and 148 and a portion of RCRA Unit 40 (Figure 1 2)

Four (4) associated Potential Areas of Contamination (PACs), 100-601, 100-602, 100-603, and 100-611 have been identified in the RFETS *Historical Release Report* (HRR, DOE 1992c) The PACs were established as the result of documented spill incidents

Unconfirmed reports of contaminant spills have been indicated in interviews with building employees In the late 1960's or early 1970's a cesium-contaminated liquid was spilled on the concrete floor in Room 109C (Figure 1 2) The floor was immediately sealed to immobilize the contamination No further action was initiated to address consequences of the spill

1 2.1 Individual Hazardous Substance Site (IHSS) 121

IHSS 121 consists of RCRA Unit 40 underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3, which were designated in the *Final Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan For Operable Unit 9* (DOE 1992a) The area has also been identified as PAC 000-121 in the HRR The OPWL system constitutes former Operable Unit No 9 (OU 9) and RCRA Unit 40, the plant-wide process waste system comprised of tank and underground pipelines constructed to transport and temporarily store process wastes from point of

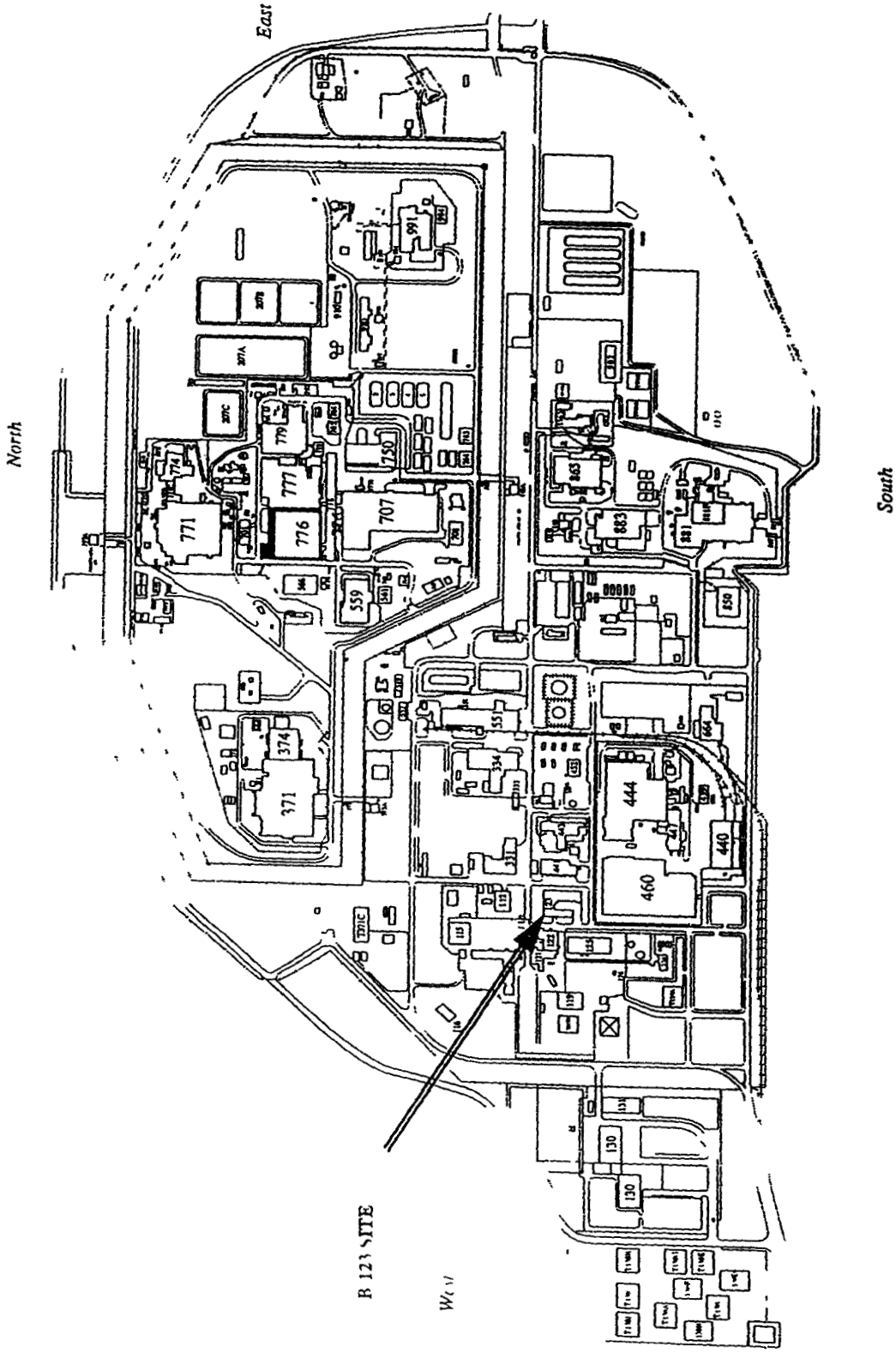


Figure 1.1 Building 123 Site Location

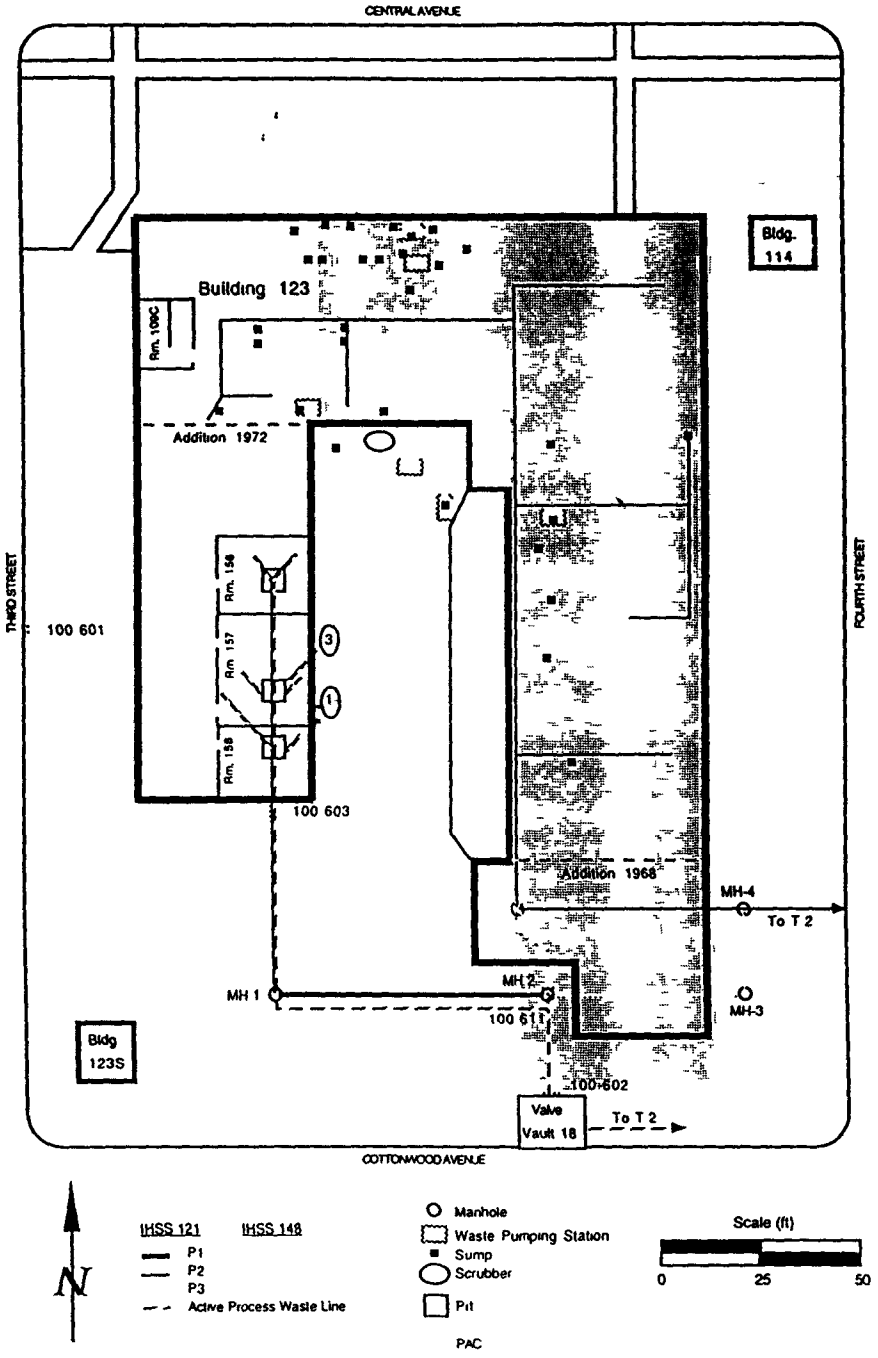


Figure 1.2 Location of Building 123 and Associated IHSSs 121 and 148

origin to on-site treatment and discharge points

All process waste generated from 1952 to 1968 was transferred from Building 123 to Building 441 through line P-2, which ran below the west side of the east wing before exiting at the southeast corner of the building In 1968 the southeast wing was extended about fifty (50) feet to the south Prior to the building addition, two manholes (MH-2 and MH-3, Figure 1 2) were constructed and the line was extended south to MH-2, then east to MH-3, and north to MH-4, before assuming the original path at P-2. The extension was designated as P-3 One manhole was abandoned and covered by the building addition In 1972 a west wing was constructed, extending south from the northwest corner of the original building Prior to construction of the wing, line P-1 was installed to transfer waste to manhole MH-1, then east to a junction with P-3 at MH-2 (Figure 1 2). The lines transferred the following process waste from Building 123

- Acids nitric acid (HNO_3), hydrofluoric acid (HF), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), acetic acid ($C_2H_4O_2$), and perchloric acid ($HClO_4$),
- Bases. ammonium hydroxide (NH_4OH) and sodium hydroxide (NaOH),
- Solvents acetone, alcohols, cyclohexane, toluene, xylenes, triisooctomine, and ether;
- Radionuclides various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm),
- Metals beryllium (Be) (trace amounts), and
- Others ammonium thiocyanate, ethylene glycol, and possible trace amounts of polychlorinated biphenyls (PCBs) (DOE 1992a)

In 1982 P-2 and P-3 were abandoned and plugged with cement In 1989 the process waste transfer system was upgraded, including removal of the east-west section of P-1 between MH-2 and MH-3 The north-south section of P-1 between Building 123 and MH-1 was converted to the new process system Three large, interconnected concrete sump pit areas were installed in Rooms 156, 157, and 158 to accommodate process waste system backup Pipe was installed connecting MH-1 to Valve Vault 18 (Figure 1 2)

Currently, all process waste throughout Building 123 is collected in floor sumps Each sump collects and temporarily stores liquid waste which is then pumped through overhead lines into a main floor sump in Room 158 The waste is then gravity-fed through P-1 to Valve Vault 18, then to underground Tank T-2 (Tank 428) at Building 441, and finally to Building 374 for treatment (Figure 1 2)

1.2 2 Individual Hazardous Substance Site (IHSS) 148

A detailed characterization of former Operable Unit No 13 (OU13) was conducted from September 1993 to February 1995 as part of a Phase I RCRA RFI/RI The characterization included high-purity germanium (HPGe) surveys, vertical soil profiles, surface soil sampling and soil gas surveys The investigation identified an area of reported small spills of nitrate-bearing wastes along the east side of Building 123 and a potential for soil contamination beneath the building due to possible leaks in OPWL P-2 The area was established as IHSS 148 and detailed in the *Final Phase I RFI/RI Work Plan for Operable Unit 13* (DOE 1992b) The area has also been identified as Under Building Contamination (UBC) 123 and PAC 100-148 in the HRR

Thirty-four (34) analytes were detected in the surface soil survey, including twenty-six (26) inorganic compounds and eight (8) radionuclides. Eleven (11) analytes exceeded background limits at a minimum of one sample location throughout IHSS 148. Constituents that exceeded minimum detection levels or activities are included in Table 1 2

Table 1.2 Constituents Detected above Minimum Detection Levels or Activities in Soil Samples Collected during Surface Soil Survey at IHSS 148

Constituents Detected Above Minimum Detection Levels or Activities	Maximum Concentration	Background Limits[a]	Tier II Soil Action Levels[b]
Chromium	95 6 mg/kg [c]	24 9 mg/kg [c]	4860 mg/kg [d]
Cobalt	28 7 mg/kg	24 8 mg/kg	123,000 mg/kg
Copper	43 4 mg/kg	27 3 mg/kg	81,800 mg/kg
Lead	165 mg kg	61 4 mg/kg	NA[e]
Nickel	52.4 mg/kg	26 8 mg/kg	40,900 mg/kg
Strontium	94 7 mg/kg	90 1 mg/kg	>1,000,000 mg/kg
Zinc	1,220 mg/kg	86 6 mg/kg	>1 000 000 mg/kg
Americium-241	0 197 ± 0 032 pCi/g	0 0227 pCi/g	38 pCi/g
Plutonium-239/-240	0 169 ± 0 04 pCi/g	0 066 pCi/g	252 pCi/g
Uranium-233/-234	2.04 ± 0.396 pCi/g	2.253 pCi/g	307 pCi/g
Uranium-238	2.14 ± 0.309 pCi/g	2 00 pCi/g	103 pCi/g

[a] Source DOE 1995, *Geochemical Characterization of Background Surface Soils Background Soils Characterization Program*, May

[b] Source DOE 1996, *Final Rocky Flats Cleanup Agreement*, July Metal analyte action levels are based on office worker exposure to soil, radionuclide action levels are based on annual dose limits

[c] Result indicates total chromium (chromium III + chromium VI)

[d] Result indicates chromium VI only Action level for chromium III is <1,000,000 mg/kg

[e] Constituent does not have an established action level

The soil-gas survey was conducted on a 25-foot grid in accordance with the work plan Sixty-four (64) soil-gas locations were sampled during the survey Thirteen (13) samples contained volatile organic compound (VOC) levels in excess of the 1 µg/ L method detection limit Benzene, toluene, ethylbenzene, and xylene (BTEX) fuel constituents were detected in samples collected from the perimeter of Building 123 and within the west and east wings of the building Trichlorofluoromethane (TCFM) was detected in nine samples distributed throughout the IHSS 148 area at levels up to 2 6 µg/ L Tetrachloroethene (PCE) was detected at 1 5 µg/ L in a sample collected to the east of Building 123 The presence of organic extraction constituents is consistent with unconfirmed reports that such liquids used in radionuclide analyses were occasionally disposed onto the soil surface outside of Building 123 and allowed to evaporate Analyses results indicate that subsurface infiltration precluded full evaporation

1 2 3 Resource Conservation and Recovery Act (RCRA) Unit 40

The Building 123 area encompasses a portion of RCRA Unit 40, which includes all active overhead

and underground and process waste lines in and around Building 123 No other RCRA unit exists in the Building 123 area. A plan for partial closure of RCRA Unit 40 will be written to characterize and manage all active OPWLs associated with Building 123, as all abandoned lines were properly decommissioned prior to implementation of RCRA regulations

1.2.4 Potential Areas of Contamination (PACs)

Potential Areas of Contamination (PACs)100-601, 100-602, 100-603, and 100-611 were identified in the HRR, and involve potential impact to the soils surrounding Building 123 All of the four (4) PACs are located in Figure 1 2 The following outlines the nature of each PAC by describing the occurrence, constituents released, and response to the occurrence

1 2 4 1 PAC 100-601, Phosphoric Acid Spill

On April 13, 1989, two five-gallon plastic containers of phosphoric acid, which were among other containers of waste chemicals awaiting disposal in a storage cabinet outside of Building 123, deteriorated and leaked a portion of the contents onto the paved ground surface Approximately one gallon of 1,2 ethylhexyl phosphoric acid leaked from the containers At the time the release was detected, approximately eight ounces of the liquid was present on the ground within the vicinity of the cabinet The spill was contained and the remaining liquid was properly disposed No further action was required to address consequences of the spill

1 2 4 2 PAC 100-602, Process Waste Line Break

On April 13, 1989, Valve Vault 17, located on Cottonwood Avenue between Building 443 and 444, was found to be flooded with approximately 1,200 gallons of aqueous waste Subsequent investigation indicated that the source of the waste was a break in the active portion of P-1 in manhole MH-1 (Figure 1 2) Leakage from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (i e soils) or a PVC electrical conduit The release also migrated into a section of the OPWL network Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, five days after the initial detection of release at Valve Vault 17 The potentially affected area includes the active process waste line between MH-2 and Valve Vault 18, the process waste line between Valve Vault 18 and Valve Vault 17, soils surrounding Valve Vault 18 and Valve Vault 17, and OPWL P-3 between MH-2 and MH-3 In July 1989, groundwater containing blue dye used several months earlier to trace the release was observed seeping into excavations around Valve Vault 18

The release consisted of Building 123 process waste An estimate was made of types and quantities of materials released to the environment during the five period between detection of the release and diversion of Building 123 wastes from the broken line The estimate was based on typical daily quantities of wastes discharged from Building 123

- 25 gallons urine,
- 12 5 gallons nitric acid (concentration unknown),
- 20 gallons hydrochloric acid (concentration unknown),
- 1 5 lbs ammonium thiocyanate,
- 1 0 lbs ammonium iodide, and'
- 2 5 lbs ammonium hydroxide (concentration unknown)

The above would have been diluted in approximately 2,000 gallons of tap water

Minor amounts of naturally-occurring uranium were detected in soil and water samples collected after the release. Alpha activity up to 140 pCi/L was recorded in samples of the waste from Valve Vault 17 One water sample from MH-2 also contained eight percent ethylene glycol Soil sampling was conducted to determine the source and extent of the release (See Section 2 1.2) A temporary aboveground line was installed, and a replacement underground was installed as part of the process line upgrades in 1989 Since the affected ares were located near existing IHSSs scheduled for investigation and remediation activities, no cleanup was initiated Water and soil samples collected for several weeks after the release indicated that contamination levels (nitrates, chlorides and pH) decreased steadily after the broken line was bypassed

1 2 4 3 PAC 100-603, Bioassay Waste Spill

On June 9, 1989, OPWL P-1 was under excavation and replacement due to a break in the line (PAC 100-602) The excavated end of the broken line as temporarily capped with a plastic bag, and Building 123 process waste was rerouted to bypass the broken line A pump used to reroute the waste failed and allowed the waste to overflow into the broken line A portion of the waste leaked around the plastic bag and into the excavation The release was confined to the excavation

The release consisted of bioassay waste containing hydrochloric acid and nitric acid The waste exhibited a pH of approximately 1 The waste may also have contained urine, and up to a combined total of 1 5 gallons of ammonium thiocyanate, ammonium iodide and ammonium hydroxide The estimated maximum volume of the spill was 30 gallons The released material mixed with rainwater in the excavation

Potential flow from the excavation was contained with earthen berms Approximately 100 gallons of rainwater contaminated by the spill were neutralized, pumped from the excavation, and transferred to the process system for treatment in Building 374 Samples were collected to evaluate the spread of contamination Results indicated that contamination was restricted to the excavation within eight of Building 123 No further action has been initiated

1 2 4 4 PAC 100-611, Building 123 Scrubber Solution Spill

On November 7, 1989 an inoperative pump in the Building 123 process waste transfer system caused the Building 123 Scrubbers 1 and 3 to overflow, spill scrubbing solution into a bermed area outside of the building and into three sump pits in Rooms 156, 157, and 158 (Figure 1 2) All of the spilled solution was contained within secondary containment structures, and none of the solution was believed to have impacted the environment The pits were pumped out and the concrete liners properly sealed It was determined that the transfer pump failure was due to blockage caused by glass filtering wool

The scrubbing solution consisted primarily of water and was used to scrub acids and salts used in Building 123 Approximately 50 gallons were released to the bermed area, and several hundred gallons were contained in the three sump pits Analysis indicated that the solution contained in the bermed area exhibited a pH of 1 6, the solution in the three pits indicated a pH of 6 0 All spilled materials were contained and transferred into the Building 123 process waste transfer for eventual treatment at Building 374

1 3 Geology

The local geologic setting includes an industrial area that has been gradually developed The natural soils have been disturbed and replaced by fill during installation of the OPWLs and covered

by pavement and structures including Building 123 The soils, fill, pavement, and structures are underlain by Rocky Flats Alluvium which averages about 38 feet in thickness and is composed of poorly- to moderately-sorted clay, silt, sand, and gravel The Cretaceous Arapahoe Formation underlies the surficial material and is mainly claystone and silty claystone with sandstone bodies present Groundwater exists below the site at a depth of approximately 12-17 feet and flows in a generally eastward direction

2.0 SAMPLING RATIONALE

Historical information detailed in Section 1.2 provides general indications of the types of compounds anticipated at each IHSS, and was used to develop a systematic sampling strategy for this investigation The sampling rationale is based on a combination of historical data and recommendations by K-H Statistical Applications (memo attached) Preliminary sampling will be restricted to soils underlying and surrounding Building 123

The following conditions were considered in the development of the sampling strategy

- the operating history of Building 123 suggests that contaminant may have been released into the environment,
- the physical and chemical properties of the contaminant suggest a chronic presence if released into the environment; and
- historical data indicate the presence of contaminants in quantities above the maximum background concentrations defined by Procedure 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials* and the *Background Geochemical Characterization Report* (DOE 1993)

The conceptual models of contaminant migration involve percolation downward through the vadose zone (generally less than 10 feet thick) to the water table and then in the direction of groundwater flow Contaminants may volatilize, biodegrade, or radioactively decay before reaching the shallowest groundwater zone Contaminant concentrations are also reduced by dispersion during migration through the porous Rocky Flats Alluvium Paved portions of the Building 123 area provide an additional impedence to contaminant migration, as precipitation is diverted to the storm water drainage system instead of percolating through the ground surface

Selection of contaminants of concern was based upon historical process data and analytical data

3 0 DATA QUALITY OBJECTIVES (DQOs)

EPA has established a process to direct Superfund decision-making as the basis for developing DQOs DQOs are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application The data must also facilitate appropriate remedial measures for mitigating risk Data requirements to support this project were developed and are implemented in the project using criteria established in *Guidance for the Data Quality Objective Process*, QA/G-4 (EPA 1994)

The DQO process contains seven sequential steps which are rationalized below

1 State the Problem

The problem is the uncertainty of the presence or absence of hazardous and/or radioactive constituents in soil beneath and surrounding Building 123 The purpose of the SAP is to collect field data to identify and delineate the extent of any subsurface contamination to support potential remedial actions

2 Identify the Decision

The decision is to specify acceptable levels of decision errors that will be used as the basis for establishing the quantity and quality of data needed to support the proper remediation of IHSSs 121 and 148

3 Identify the Inputs to the Decision

The following information will be required to resolve the decision

- Historical Information
- Media Sampling (as outlined in Section 4 0)

4 Define the Study Boundaries

The methodology contained in this document applies to all buildings and areas associated with the Building 123 cluster

5 Develop a Decision Rule

Data collected during this project will be evaluated in accordance with all applicable regulatory requirements Exceedances of soil action levels will be evaluated for possible remedial action

6 Specify Tolerable Limits on Decision Errors

The error rates for data collected during this study are incorporated into the detection limits for the analysis parameters Thus, it has been determined that these limits are acceptable for the DQOs

7 Optimize the Design

The data collection design will be optimized by utilizing Characterization Instructions and Decommissioning Characterization Protocols, which will be developed for this project in accordance with the guidelines in the *Multi-Agency Radiological Site Survey and Site Investigations Manual* (MARSSIM) and the draft NRC NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Termination*

Data will be analyzed and compared to surface and subsurface soil action levels specified in RFCA Evaluation of sample analyses may warrant a source removal action or separate groundwater investigation If required, the data will also be the basis for corrective measure design

4.0 SAMPLING ACTIVITIES

4.1 Sample Location and Frequency

The sampling event focuses on the soils underlying and surrounding Building 123 as indicated in Figure 4 1 Subsurface soils will be sampled to a total depth of six (6) feet as described in Section 4.3 , as historical data indicates that the presence of contaminants below this depth is unlikely (DOE 1992b) Evaluation of sample analyses results may indicate if the potential exists for groundwater contamination

Fifty-seven (57) locations will be sampled seven (7) will be collected from the building slab, twenty-seven (27) will be located underneath the Building foundation, and twenty-three (23) will be located in areas surrounding Building 123 (Figure 4 1) Locations were determined with respect to underground OPWLs, paved and unpaved areas, and recommendations by K-H Statistical Applications The investigation will focus on the following areas

- unpaved areas along the east side of Building 123, to further characterize potential areas of volatile organic constituent contamination,
- underground OPWLs beneath and to the south of Building 123,
- points at which the overhead waste process lines enter the subsurface at the south end of the west wing of Building 123,
- areas of reported surface spills within Building 123, including Room 109C (See Figures 1 2 and 4 1) and Potential Areas of Contamination (PACs),
- locations of process waste sumps, waste pumping stations, and OPWL junctions and elbows, and
- a sampling grid at approximately 50-foot intervals to characterize the remainder of the Building 123 area According to *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area* (DOE 1992) and personnel interviews, no contaminant spills or leaks have been reported in these areas, thus a uniform sampling grid is appropriate

One soil sample will be collected at each location Figure 4 1 indicates depths at which each sample will be collected Locations outside of Building 123 will be sampled at the total depth of six (6) feet Locations within the Building 123 perimeter near waste pumping stations, sumps, and junctions will also be sampled at a depth of six (6) feet, as building as-built drawings indicate that the pipelines exist at a maximum depth of five (5) feet, and leaks associated with underground lines characteristically migrate downward Additional samples may be collected at shallower depths if visible evidence of contamination is detected All remaining locations will be sampled immediately beneath the building slab (approximately one foot below slab surface) in response to reports of small liquids spills in Building 123. A sample of the concrete slab will also be collected at the these locations Additional samples may be collected at greater depths if visible evidence of contamination is detected

4 2 Sample Designation

The site standard sample numbering system will be implemented in this project A simple, unique, alphanumeric location code will be assigned to each sample while in the field Prior to sample

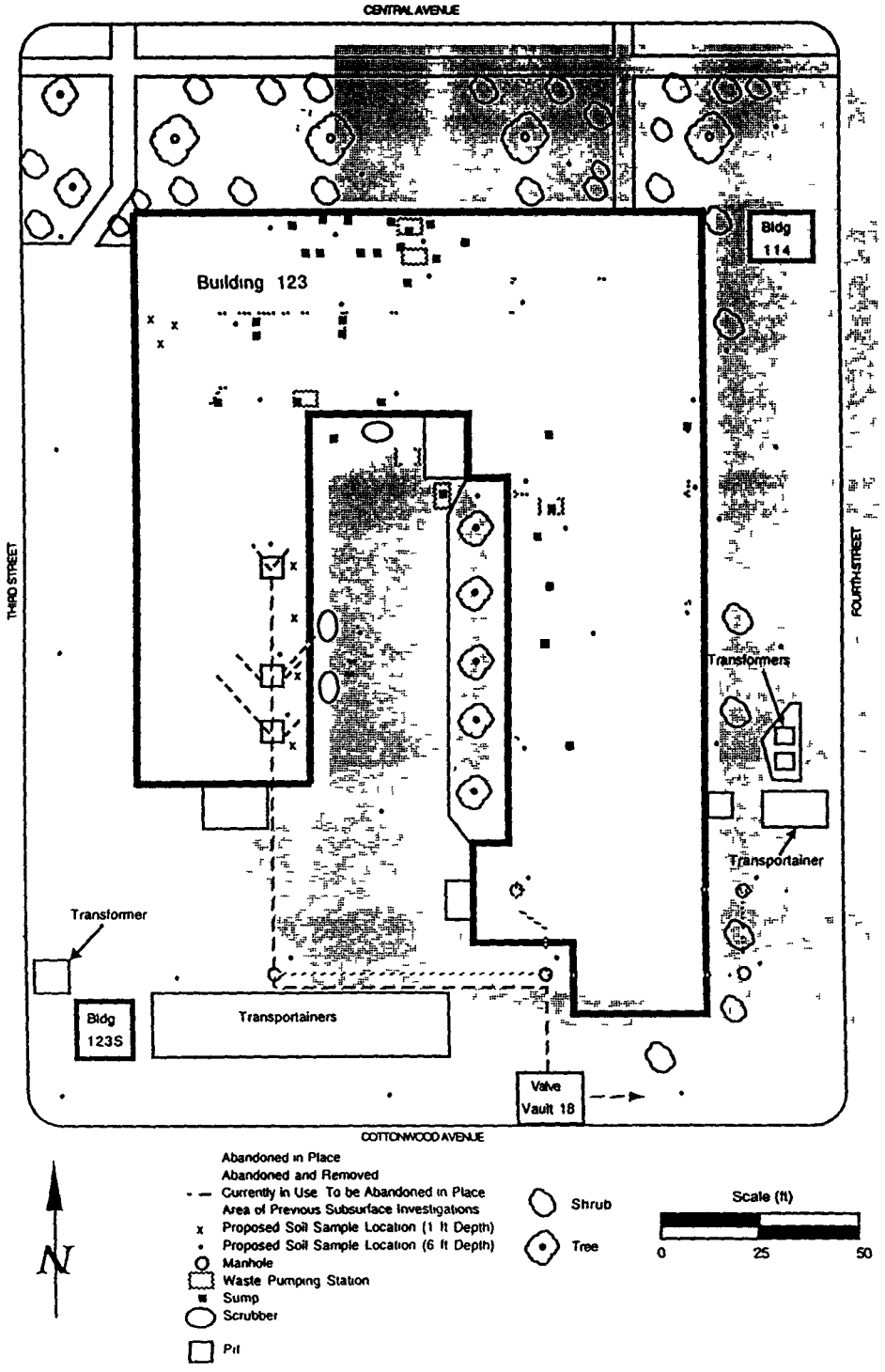


Figure 4 1 Soil Sampling Locations

collection, each sample location will be established using tape and compass. Sample locations outside Building 123 will be marked with a reference flag or stake; locations on the building slab will be marked with fluorescent spray paint Sample numbers will be assigned to the project by the Rocky Flats Environmental Database System (RFEDS) Group In preparation of the final report, a matrix will be developed to correlate the individual sample numbers to location codes

4.3 Sample Collection

Sample depths will be reached using a Geoprobe© truck-mounted hydraulic ram in accordance with 5-21000-ER-OPS-GT.39 *Push Subsurface Soil Sampling* Soils under the Building 123 slab will be accessed using a rotary-type concrete corer. For samples collected at a depth of six (6) feet, soil cores will be recovered continuously in two-foot increments using a 2-inch diameter by 24-inch long stainless steel-lined California core barrel Samples will be collected from the bottom of the third core Cores will be monitored with a Flame Ionization Detector (FID) or a Photoionization Detector (PID) in accordance with 5-21000-OPS-FO 15 *Photoionization Detectors and Flame Ionization Detectors* A Radiological Control Technician (RCT) will scan each core with a portable Electra scintillation counter Equipment will also be monitored for radiological contamination during sampling activities All sampling equipment will be decontaminated with an Alconox solution, and rinsed with deionized water, in accordance with EMD Operating Procedure 5-21000-OPS-FO 03, *General Equipment Decontamination, Section 5 3 1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field* All other sampling equipment will include standard items such as chain of custody seals and forms, logbooks, etc The cores will be visibly inspected for signs of contaminant staining, then visually logged by the field geologist as per 5-21000-ER-OPS-GT 01 *Logging Alluvial and Bedrock Material* Additional samples will be collected if cores exhibit visible evidence of contamination at shallower depths

Three (3) field duplicates will be collected to represent at least 5% of the sample batch to provide adequate information on sample variability, as defined in *Guidance for Data Quality Objectives Process* (EPA 1994)

Personal Protective Equipment will be worn in accordance with 5-21000-OPS-FO 06 *Handling of Personal Protective Equipment*

Sample points will be surveyed for location and elevation using Global Positioning System (GPS) equipment to ensure accuracy in data plotting

4 4 Sample Handling and Analysis

Samples will be handled according to *Environmental Management Department Operating Procedures Volume/ Field Operations*, OPS-FO 13, *Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*, and OPS-FO 10, *Receiving, Labeling, and Handling of Environmental Containers*

Table 4 4 indicates analytical requirements Samples will be submitted to an offsite, EPA-approved laboratory for analysis under a 30-day result turnaround time

5.0 DATA MANAGEMENT

A project field logbook will be created and maintained by the project manager or designee in accordance with 2-S47-ER-ADM-05 15 *Use of Field Logbooks and Forms* The logbook will include time and date of all field activities, sketch maps of sample locations, or any additional information not

Table 4.4 Analytical Requirements for Soil Samples

Analysis	EPA Method	Container	Preservation	Holding Time
Target Analyte List (TAL) Metals	EPA 6010	1 (one) 250 ml wide-mouth glass jar	Cool, 4°C	180 Days
Target Compound List (TCL) Volatiles	EPA 8260A	2 (two) 125 ml wide-mouth glass teflon-lined jar	Cool, 4°C	7 days
TCL Semi-Volatiles	EPA 8270B	1 (one) 250 ml wide-mouth teflon-lined jar	Cool, 4°C	7 days until extraction, 40 days after extraction
TCL PCBs	EPA 8080A-8081	1 (one) 250 ml wide-mouth teflon-lined jar	Cool, 4°C	7 days until extraction, 40 days after extraction
Total Organic Carbon (TOC)	EPA 415 1	1 (one) 250 ml wide-mouth teflon-lined jar	Cool, 4°C	7 days until extraction, 40 days after extraction
Nitrates	EPA 300 Methods	1 (one) 250 ml glass jar	Cool, 4°C	2 days
Gross Alpha/Gross Beta	EPA 9310	1 (one) 100 ml glass jar	Cool, 4°C	180 days
Isotopics (U233/234, U235, U238, Am241 Pu239/240)	NA[a]	1 (one) 250 ml glass jar	None	180 days

[a] No EPA-approved method is currently in place for isotopics analysis However, guidance is provided in procedures defined in Environmental Monitoring Support Laboratory (EMSL)-LV 0539-17, *Radiological and Chemical Analytical Procedures for Analysis of Environmental Samples*, March 1979

specifically required by the SAP The originator will legibly sign and date each completed original

hard copy of data A peer reviewer will examine each completed original hard copy of data Any modifications will be indicated in ink, and initialed and dated by the reviewer

Data for this project will be collected, entered, and stored in a secure, controlled, and retrievable environment in accordance with 2-G18-ER-ADM-17 01 *Records Capture and Transmittal* Results will be compiled into a Sampling and Analysis Report (SAR) Location and analytical data will be entered into and stored in the Geographical Information System (GIS) files

6 0 QUALITY ASSURANCE

Analytical data collected in support of this investigation will be evaluated using the guidance

established by 2-G32-ER-ADM-08 02 *Evaluation of ERM Data for Usability in Final Reports* This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters For precision, the typical relative percent difference been samples and duplicates is less than or equal to 40% for soil Duplicates comprise 5% of the total sample batch Accuracy is the responsibility of the laboratory Comparability will be evaluated by comparing historical data with data collected during this event and will be followed in accordance to EPA regulations and Waste Acceptance Criteria, through which data will be validated Completeness (90% of valid data) will be evaluated by comparing the SAP to the actual sampling episode

7.0 SCHEDULE

Sample collection and analyses will be conducted in two phases Phase I will involve collection of twenty-three (23) samples outside of Building 123, including one (1) field duplicate, Phase II will involve collection of thirty-four (34) samples within and beneath the Building 123 slab, including two (2) field duplicates Phase I samples will be collected at least six (6) weeks before scheduled demolition of Building 123, to allow for turnaround of sample results and data review. Phase I sample results may warrant changes in Phase II sample location and frequency, at which time the SAP will be amended to accommodate such changes

8 0 ADDITIONAL ACTIVITIES

8 1 Closure of RCRA Unit 40

The Building 123 slab will remain in place following completion of demolition activities Proper closure of underground, active lines will be contingent upon rinsate and soil sampling analyses results for constituents listed in Table 4 4 In the event that no contamination above Tier II action levels (RFCA, Appendix 6) is detected, the lines will be remediated in accordance with the Closure Plan All surface openings to active lines will be capped with a plug of non-shrinking bentonite slurry, and the lines will be abandoned in place under the RCRA Unit 40 Closure Plan Such an action will be considered a RCRA stable configuration in accordance with the Site Part B Operating Permit

8.2 IHSS Remediation

8.2 1 Soil Remediation

The extent of subsurface contamination will dictate the method of remediation Areas in which soil sample results meet Tier II criteria will require no further action Areas that exhibit radioactive or chemical contamination at levels in excess of RCRA regulatory levels will be excavated using conventional techniques and removed and disposed offsite as RCRA hazardous waste At the completion of excavation activities, verification samples will be collected along the base and sides of the excavation(s) to determine post action condition of the subsurface soils Samples will be analyzed according to the SAP If analytical results indicate that contamination is present above Tier II Action Levels, further excavation and sampling will continue until the Tier II criteria are met

8.2 2 OPWL Remediation

Abandoned OPWLs will be managed according to analyses results from soil samples collected adjacent to and beneath the lines Any indication of soil contamination as a consequence of leaking underground lines will eventuate proper removal and disposal of the lines Lines P-2 and P-3 and

portions of P-1 were properly abandoned in 1982 and are not regulated under RCRA If Phase II sample results indicate that the OPWLs are a source of subsurface contamination, the slab and all underground piping associated with Building 123 will be removed and treated as contaminated waste Additional sampling may be required to further characterize potentially contaminated areas

8.3 Disposition of Waste

Remediation and closure activities may generate a combination of radioactive, hazardous and mixed wastes Contaminated soil and pipeline material are expected to be the major sources of waste Wastes consisting of plastic, tools, PPE, and other materials associated with remediation will also be a major source of waste Following remediation activities, the RFETS Building Radiation Cleanup Standard (BRCS) will be utilized to determine if residual radioactive constituents contained in remaining equipment and remediation debris is compliant with RFCA guidelines and appropriate as-low-as-reasonably-achievable (ALARA) considerations The BRCS is currently under development in coordination with the EPA, CDPHE, and DOE Until the BRCS is approved, more conservative criteria defined in DOE Order 5400 5 and associated RFETS radiation protection procedures will be used to manage debris generated by remedial activities Contaminated waste will be handled by qualified waste packaging technicians who will support decontamination specialists and radiation control technicians to identify and segregate the Hazardous of Low Level waste Drums or boxes will be provided by the Waste Disposal group Waste packaging technicians will package and label the waste and will arrange for radioactive waste to be certified by the Waste Certification group The Project Waste Coordinator will work with the certification personnel and prepare all required documentation Liquid waste generated during decontamination of sampling and associated equipment will be collected in drums and shipped to Building 374 for processing Solid waste will be managed by the Waste Disposal group and moved to a temporary staging area immediately adjacent to the site and placed in rolloff containers until proper disposition is determined Contaminated soil and pipeline material will ultimately be disposed offsite as RCRA hazardous waste

9.0 REFERENCES

DOE 1992a, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Original Process Waste Lines*, March

DOE 1992b, *Final Phase I RFI/RI Work Plan for Operable Unit 13, 100 Area*, October

DOE 1992c, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO

DOE 1993, *Background Geochemical Characterization Report*, September

DOE 1994, *Final Phase I RFI/RI Work Plan for Operable Unit 9, Technical Memorandum No 1, Volume IIA-Pipelines*, November

DOE 1996, *Rocky Flats Cleanup Agreement, Final*, July

EPA 1994, *Guidance for Data Quality Objectives Process*, EPA QA/G-4, September

RMRS 1997a, *Proposed Action Memorandum for the Decommissioning of Building 123*, May

RMRS 1997b, *RMRS Quality Assurance Program Description, RMRS-QAPD-001, Rev 1*, January

RMRS 1997c, *Final Sampling and Analysis Plan for the Pre-Remedial Investigation of the Mound Site Plume*, February

KAISER • HILL
COMPANY

INTEROFFICE MEMORANDUM

DATE June 19, 1997

TO Kirk K. Hilbelink, RMRS Engineering Const and Decomm , T130F, x6232

FROM Thomas R Gatliffe, Statistical Applications Engineering, Bldg130, x6548

SUBJECT REVIEW OF STATISTICAL ADEQUACY OF DRAFT SOIL SAMPLING AND ANALYSIS PLAN TO SUPPORT BUILDING 123 D&D - TRG-015-97

Per your request of June 12, 1997, I have reviewed the document entitled *Soil Sampling and Analysis Plan To Characterize Integrated Hazardous Substance Sites (IHSS) 121 and 148 at Building 123 (Draft)* dated June 1997 with the objective of assessing the adequacy of the proposed sampling locations and sample size Based upon the background information provided and the historical results of earlier characterization efforts for IHSS 148, it is my considered professional judgement that the proposed sampling locations and frequency should be adequate to characterize the subsurface soils in the vicinity of and under the Building 123 slab in the absence of isolated areas of significantly elevated levels of contamination ("hot spots") If one or more hot spots are detected in the initial sampling, additional sampling in the vicinity of the detected hot spot(s) will be required to assess the extent of the significantly contaminated area, the degree and nature of contamination, and the magnitude of clean-up effort required

With respect to the potential existence of hot spots, likely locations would be in the vicinity of sumps and points of redirection of underground process waste lines (PWL) The existence of hot spots elsewhere is unlikely based upon the historical information and the results of earlier characterization efforts for IHSS 148 The probability of detection of a hot spot is a function of its expected planar size and shape and the likelihood that a sample location falls within the hot spot footprint (R O Gilbert, 1987, *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, provides more detailed discussion on this subject) Since all of the likely hot spot locations are beneath the building slab and unlikely to be affected by leaching by rainwater, a generally circular diffusion pattern and downward infiltration path can be assumed

Based upon the locations shown in Figure 4 1 of the proposed sampling plan and assuming they are plotted to scale, it is estimated that any hot spot with a radius of fifteen feet or greater would by detected with approximately ninety-five percent probability Any hot spot emanating from a sump with a radius of twelve-feet or more or emanating from a PWL point of redirection with a radius of six feet or more would be detected with approximately eighty percent probability If hot spots of smaller size are anticipated, high detection probabilities can only be achieved by increasing the number of samples and fixing their locations closer to the more isolated potential hot spots

If you have questions or desire further information concerning the material provided in this letter or if I may be of further assistance with regard to this or any other matter, please do not hesitate to contact me at your convenience

cc
E G Nuccio, Engineering Support Services

RMRS Rocky Mountain Remediation Services, L L.C.
protecting the environment

TO Kent Dorr, K-H Project Management, Building T130F, X6034

FROM Doug Steffen, RMRS E/C/D Project Management, Bldg T130F, X2164

DATE August 28, 1997

SUBJECT **Soil Sampling and Analysis Plan to Characterize IHSSs 121 and 148 at Building 123: Response to CDPHE Comments**

Below are the proposed responses to comments received from CDPHE on the Building 123 Soil SAP The SAP was modified in accordance with the responses provided below Text has been added to or deleted from the document since the last revision, thus requiring changes in page numbers and topic heading and subheading numbers In such cases, the current heading numbers have been included in the response Please review these responses and provide comments such that any modifications can be added to the SAP

Originator(s): Carl Spreng, Chris Gilbreath, CDPHE

1 Section 1 1

In two places in Section 1 1, former operable units under the IAG are referenced The references to OU9 on Page SAP-1 and OU 13 on Page SAP-3 should be preceded by the word "former" or be deleted altogether

RESPONSE
Section 1 1 and all other sections referencing Operable Units were changed by adding the word "former" before each citation of OU 9 and OU13

2 Table 1 1 (Table 1 2 in current revision)

In Table 1 1, footnote "a" should explain the PRG values are those based on residential exposure to soil The value listed for chromium is the average of PRGs for Cr III and Cr VI, which is inappropriate Footnote "b" does not apply to cobalt, which does have a PRG, but should be applied to lead, which does not It is unclear where the values for the 4 radionuclides came from The value listed for Uranium-233/234 is the PRG for Uranium-233, but the other values are not found in the latest PRG tables Even though the PRGs may have been used for comparison in the 1992 work plan, the most appropriate values with which to compare the maximum concentrations of the 11 analytes would be the corresponding Soil Action Levels For the first 7 analytes (metals), these are the PRGs for office workers The radionuclide action levels were derived separately based on annual dose limits

RESPONSE
Table 1 1 was changed to Table 1 2 and was revised to indicate maximum concentrations with respect to background limits (set by the Background Soil Characterization Report) and Tier II Soil Action Levels for office worker exposure to soil The maximum concentration and background limit for chromium was reported as total chromium (Cr III + Cr VI). The Tier II action level was reported for Cr VI which is the most conservative limit of the two analytes The action limit for Cr III was added as a footnote All references to PRGs were removed from the document, as PRGs were current at the time of the soil investigation, but are now obsolete

3 *Section 1 1*

Section 1 1 explains the backgrounds of IHSSs 121 and 148, but fails to mention the 5 PACs in the area of Building 123 100-601, 100-602, 100-603, 100-610, 100-611

RESPONSE
A section (1 2 4, *Potential Areas of Contamination*) was added to the document to address the PACs associated with Building 123 PAC 100-610 was not included in this section because it was an airborne asbestos release and is not expected to impact the soil investigation or analyses results Additionally, the occurrence was considered a "no further action" incident following repair of the damaged pipe insulation, and has since been removed from the PAC list

4 *Section 2 0, first paragraph*

The "additional characterization" mentioned in the first paragraph of Section 2 0 should be clarified What sort of additional sampling is anticipated to be triggered by what sort of initial analytical results? Additional sampling would require modification of this SAP

RESPONSE
Additional sampling and characterization activities are addressed in Section 8 0 (Page 13) References are also made in this Section to a closure plan under development for RCRA Unit 40 Additional sampling will be contingent upon fulfillment of Tier II criteria

5 *Section 3 0, State the Problem*

In Section 3 0 under State the Problem, the phrase, "building status in terms of the", should be eliminated

RESPONSE
The sentence in Section 3 0 (Page 8) was revised to state "The problem is to determine the presence or absence of hazardous and/or radioactive constituents "

6 *Section 3 0, Identify the Decision*

Since this SAP relates to IHSSs 121 and 148 and not the D&D of Building 123, the statement under Identify the Decision in Section 3 0 should be restated

RESPONSE
The sentence in Section 3 0 (Page 8) was revised to state "The decision is to specify acceptable levels of decision errors that will be used as the basis for establishing the

quantity and quality of data needed to support the proper remediation of IHSSs 121 and 148 "

7 *Section 3 0, Develop a Decision Rule*

The statement under Develop a Decision Rule in Section 3 0 might be clearer if revised as follows "Exceedences of soil action levels will be evaluated for possible remedial action."

RESPONSE
The statement in Section 3 0 (Page 8) was revised to state "Exceedences of soil action levels will be evaluated for possible remedial action "

8 *Section 3 0, Specify Tolerable Limits on Decision Errors*

Under Specify Limits on Decision Errors in Section 3 0, replace the first "the" in the second paragraph with "that"

RESPONSE
The sentence in Section 3 0 was revised to state "Thus, it has been determined that these limits are acceptable for the DQOs "

9 *Section 3 0, Optimize the Design*

The Characterization Instructions and Decommissioning Characterization Protocols mentioned under Optimize the Design in Section 3 0 should be included, described or referenced in this SAP

RESPONSE
A statement was added to this section to indicate that the protocols are being developed for this project with respect to MARSSIMs and NRC NUREG/CR-5849

10 *Section 3 0, second-to-last paragraph*

The second-to-last paragraph in Section 3 0 misstates the basis for soil action levels Rather than attempt to describe the various bases for soil action levels, the last two paragraphs should be deleted and replaced with "Data will be analyzed and compared to surface and subsurface soil action levels specified in RFCA Evaluation of sample analyses may warrant a source removal action or separate groundwater investigation If required, the data will also be the basis for corrective measure design"

RESPONSE
The last two paragraphs of Section 3 0 were deleted and replaced with "Data will be analyzed and compared to surface and subsurface soil action levels specified in RFCA Evaluation of sample analyses may warrant a source removal action or separate groundwater investigation If required, the data will also be the basis for corrective measure design "

11 *Section 4 0*

In Section 4 0, the purpose of the cluster of 3 shallow samples in the northeast part of the building is not explained What features determined the location of this cluster?

RESPONSE
The sample cluster was designated in response to a purported cesium-contaminated liquid spill in Room 109 C A reference to the spill was added to the bullets in Section 4 1

12 *Table 4 1 (Table 4 4 in current revision)*

Analytical methods should be referenced either in Table 4 1 or in the text

RESPONSE
Analytical methods were added to Table 4 4

13 *Section 4 3*

Field screening for radionuclides should be included as part of the sample collection protocol

RESPONSE
The following statements were added to Section 3 0 "A Radiological Control Technician (RCT) will scan each core with a portable Electra scintillation counter Equipment will also be monitored for radioactive contamination during sampling activities "

14 *General*

Waste stream generated during this project (e g , used PPE, IDM, tarps, etc) should be identified so that sampling can support waste packaging storage and disposal requirements

RESPONSE
Section 8 3 (Page 14) was added to the document to discuss disposition of waste

RF/RMRS-97-052

Closure Plan for Building 123 Components of RCRA Unit 40

U. S. Department of Energy

Rocky Flats Environmental Technology Site

September 1997

CLOSURE PLAN FOR BUILDING 123
COMPONENTS OF RCRA UNIT 40

REVISION 0

SEPTEMBER 1997

This Closure Plan has been reviewed and approved by.

Doug Steffen, Project Manager — 9/4/97 Date

Ted Hopkins, Environmental Compliance — 9/4/97 Date

Revised 9/26/97

This Closure Plan was prepared by

Richard T. Jensen, Senior Engineer — 9/4/97 Date

Revised 9/26/97

TABLE OF CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

Partial closure of RCRA Unit 40 includes the closure of the RCRA regulated process waste lines, sumps, and pumping stations associated with Building 123 at the Rocky Flats Environmental Technology Site (RFETS) This system includes process waste lines currently used in the building, as well as one active underground line The Building 123 area encompasses overlapping Individual Hazardous Substance Sites (IHSSs) 121 and 148 IHSS 121 includes the underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3 Figure 1-1 shows the location of Building 123 and IHSSs 121 and 148 Leakage from old process waste lines and possible spills from operations may have resulted in contaminated soil beneath and adjacent to Building 123 This potentially contaminated soil has been designated IHSS 148 The OPWL is a network of tank and underground pipelines constructed to transport and temporarily store process waste from point of origin to on-site treatment and discharge points. Both the active and inactive systems include underground lines that transfer the process waste to valve vaults or holding tanks. All process waste lines inside the building are currently active Closure will include deactivation, dismantlement, and remediation of all system components in Building 123, and the active underground pipeline that leaves the building and extends to Valve Vault 18

Partial closure of RCRA Unit 40 is part of a larger project to decontaminate and decommission (D&D) Building 123 and surrounding area This project will remove Buildings 123, 123S, 113, and 114 at RFETS, eliminate IHSS 148, and close a portion of RCRA Unit 40 The Building 123 slab and foundation will be removed as required to remediate contamination beneath the building as dictated by soil sampling results The overall project is being conducted as an accelerated action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) approved under the Building 123 Proposed Action Memorandum (PAM) The PAM is a decision document for the D&D of Building 123 and has been approved by the Colorado Department of Public Health and Environment (CDPHE) The Building 123 PAM references this unit closure plan RCRA Unit 40 is currently under Interim status, and as a result, partial closure activities fall under Colorado Hazardous Waste Regulations Part 265, Subpart G -"Closure and Post Closure"

1 1 APPLICABILITY

This RCRA Closure Plan applies to both the aboveground and subsurface Process Waste Tank System found in and beneath Building 123 This Closure Plan will identify the options available for the management, and the removal and/or remediation of this system This Closure Plan does not apply to the inactive portion of the P-1 Pipeline, to Pipelines P-2, or P-3 nor to any soil contamination found under this building

The underground process waste line connecting Building 123 to Valve Vault 18 is the only active part of RCRA Unit 40 associated with Building 123 Part of P-1 was incorporated into the current system Pipelines P-2, P-3, and sections of P-1 under Building 123 were abandoned in 1982 Building operations prior to 1985 were not regulated under RCRA, and, therefore, these pipelines are not part of RCRA Unit 40 As such, they are not included with this closure plan The Building 123 PAM and Building 123 IHSS Sampling and Analysis Plan (SAP) address the investigation and potential remediation of the abandoned lines and any soil contamination created by the lines

2.0 FACILITY CONTACT

The RFETS contact for closure activities is

Manager, Rocky Flats Field Office
U S Department of Energy
P O Box 928
Golden, Colorado 80402-0928

Phone (303) 966-2025

3.0 UNIT CLOSURE NOTIFICATION, CERTIFICATION AND SCHEDULE

The closure of the Building 123 process waste system, sumps, and underground pipelines will be conducted as a partial closure of Unit 40 Notification will be submitted to the Director of the Colorado Department of Public Health and Environment (CDPHE) of the intent to close the process waste system 45 days prior to the planned start of closure activities Preliminary work as described in Section 7 0 will already have been completed

If the total time necessary for closure is expected to exceed 180 days, the facility will notify the Director within 30 days of such a determination (Part 265 113(b)) and at least 30 days prior to the expiration of the 180 day closure period (Part 265 113(c))

Within 60 days after completion of closure activities, the facility will notify CDPHE through submittal of proper certification that the unit has been closed in accordance with the approved closure plan The certification package will be signed by the owner or operator and by an independent, Colorado-registered professional engineer

4.0 REGULATORY REQUIREMENTS

A plan for closure of RCRA hazardous waste treatment and storage units at RFETS is required pursuant to 6 CCR 1007-3, Part 265 of the Colorado Hazardous Waste Regulations Part 265, Subpart G - "Closure and Post Closure", Sections 265 110 through 265 120 No demonstration of financial responsibility is required because compliance with 6 CCR 1007-3, Part 266, Subpart A - "Financial Requirements", is not required for government owned facilities

5.0 UNIT DESCRIPTION

RCRA Unit 40

RCRA Unit 40 is the site-wide network of tanks, pipelines, and sumps constructed to transport and temporarily store process waste from point of origin to on-site treatment and discharge points Operation of the process waste system in Building 123 began in 1952 in the east and central wings The west wing was added in 1972 The process piping in the building was replaced in 1989, and has been in use until shutdown of the building in 1997 Sections of Unit 40 covered by this plan include all process waste system components in Building 123, and one active underground line Three other underground lines designated as P-1, P-2, and P-3 exist under Building 123 A diagram of the building and the associated underground process waste lines are shown in Figure 1-1

The process waste system incorporated into RCRA Unit 40 includes the system components in Rooms 103A, 103, 105, 111, 112, 113B, 123A, 123, 124, 125, 126, 126C, 127, 155, 155B, 156, 157, and 158 in the building, and the active underground line that connects to Valve Vault 18 The underground line is shown in Figure 1-1 as the "Active Process Waste Line"

In 1989, the process waste transfer system was upgraded, including the removal of an east-west section of P-1 between MH-2 and MH-3 The north-south section of P-1 between Building 123 and MH-1 was converted to the new process system Three large, interconnected concrete sump pit areas were installed in Rooms 156, 157, and 158 Piping was installed connecting MH-1 to Valve Vault 18 A drawing of Building 123 is included in Appendix A The drawing shows the locations of overhead and underground lines

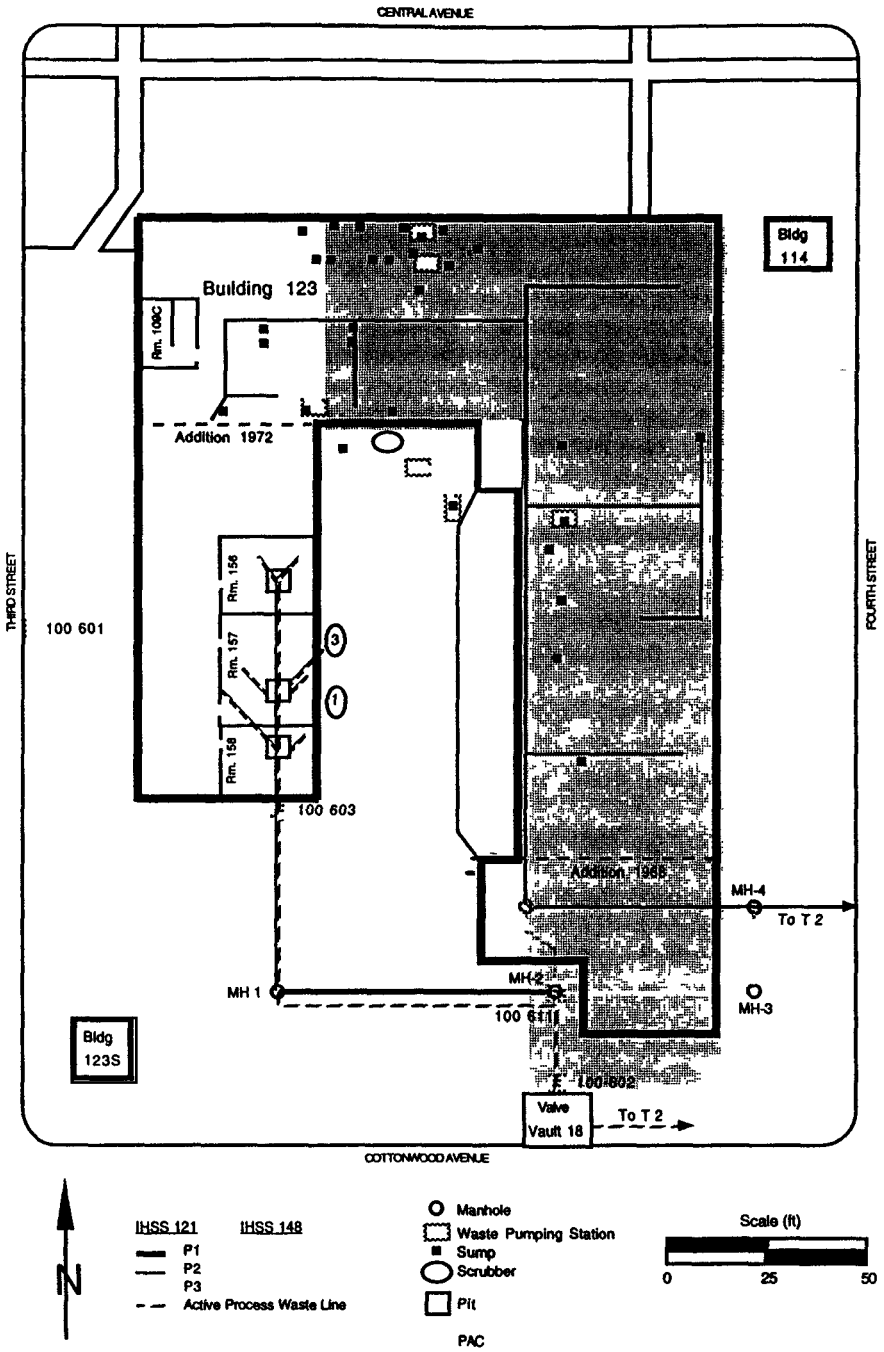


Figure 1-1 Location of Building 123 and Associated IHSSs 121 and 148

6.0 CHARACTERIZATION

6.1 PROCESS WASTE LINE CHARACTERIZATION

6.1.1 Above Ground Portion of RCRA Unit 40 in Building 123

In 1989, the majority of the above ground portion of the waste process system was replaced. At that time, administrative controls were established that prohibited the disposal of listed hazardous waste to the waste process system In addition, satellite accumulation areas were established to manage all listed hazardous wastes generated in Building 123 Beginning in 1989, the portion of RCRA Unit 40 within Building 123 was used predominately as an elementary neutralization unit for D002 corrosive waste streams However, organic compounds such as Dibutyl-n-n-diethyl carbamoyl phosphate (DDCP) and toluene were used in very small quantities for Americium separation These wastes were disposed to the waste process line The Waste Stream Residue Identification and Characterization (WSRIC) system does not identify any of these waste streams as being either RCRA listed or characteristic

The WSRIC identifies the following process wastes as being disposed of in the process waste system

Acids nitric acid, hydrofluoric acid, sulfuric acid, hydrochloric acid, acetic acid, formic acid, oxalic acid, and perchloric acid,

Bases ammonium hydroxide and sodium hydroxide,

Radionuclides various isotopes of plutonium, americium, uranium, and curium,

Metals Calcium, Magnesium, and Iron effluents, beryllium (trace amounts), and

Others ammonium nitrate, ammonium thiocyanate, ammonium chloride, ammonium oxalate, ammonium hydroxylamine, ethylene glycol, DDCP, Diethylenetriaminepentaacetate (DTPA) potassium permanganate, potassium permanganate, sodium nitrate, sodium carbonate and toluene

Based upon process knowledge, materials from this unit (pipelines, pumps, sumps, etc) must be managed as low level radioactive waste As a result, components of this unit determined to be both RCRA hazardous and low level radioactively contaminated, will be managed as RCRA Mixed Waste

6.2 SOIL CHARACTERIZATION

A complete soil characterization of the Building 123 area will be conducted as part of the activities outlined in the Building 123 Proposed Action Memorandum Soil characterization will include sampling and analysis of the soil beneath and surrounding Building 123 Following removal of the building superstructure, samples will be collected through the slab to determine the necessity for soil remediation The Building 123 and IHSS 121 SAP has been written to guide characterization activities in these areas The SAP incorporates a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol The RFETS Statistical Applications Group will be used to ensure that statistically valid and representative samples of each waste stream are taken Current planning indicates a need for approximately fifty (50) soil samples beneath the slab of Building 123 and from areas surrounding underground, abandoned OPWLs Samples will be collected at depths immediately below the pipe to locate any contamination that may have leaked from the lines Samples will be analyzed for Volatile Organic Compounds (VOCs) Target Analyte List (TAL) Metals radionuclides and nitrates Data quality

requirements supporting the analysis effort will conform to criteria established in "Guidance for the Data Quality Objective Process", EPA QA/G-4 (EPA 1994) The Data Quality Objectives are listed in the "Building 123 and IHSS 121 SAP" (See RF/RMRS-97-023)

7.0 PRELIMINARY WORK ON ABOVE GROUND PORTION OF RCRA UNIT 40 IN BUILDING 123

The above ground portions of the RCRA Unit 40 will be removed prior to approval of the RCRA Closure Plan The piping will be visually inspected, to determine if residuals and/or scaling remain in the pipe

All solid waste that is generated (i e , PVC and steel piping, sumps, etc) will be considered "newly generated wastes". These waste streams will be characterized in accordance with 6 CCR 1007 3 Section 262 11 using process knowledge and/or analytical data

7.1 DISPOSITION OF THE ABOVE GROUND PORTION OF RCRA UNIT 40 IN BUILDING 123

- Piping in the above ground portion of RCRA Unit 40 in Building 123 is assumed to be low-level radioactively contaminated wastes because of the liquids carried during operations,
- Upon removal, an examination of the piping will be made
  - If the pipe is clean inside (i e , does not contain scale or residue), it will be disposed of as low level radioactively contaminated waste at either Envirocare or Nevada Test Site,
  - If there is scale inside the piping, the appropriate tests will be run to determine if the scale composition is such that results in the pipe being classified as mixed waste In that case, the pipe will be disposed of as low level mixed waste at Envirocare or another approved TSDF,
- All pipe is either low level waste or low level mixed waste,
- The pipe will not be rinsed to attempt to reduce contamination inside the pipe, because it will generate rinsate,
- If any part of RCRA Unit 40 in Building 123 is sanitary waste, this waste will be sent to the industrial landfill in Erie, Colorado operated by U S A Waste This company is under contract to Rocky Flats

8.0 CLOSURE PERFORMANCE STANDARD

The closure performance standard specifies that hazardous waste facilities are to be closed in such a way as to (1) minimize the need for further maintenance at the facility, and (2) protect human health and the environment by controlling, minimizing, or eliminating potential releases of hazardous waste to the environment (6 CCR 1007-3, Section 265 111)

The portion of RCRA Unit 40 within or below Building 123 will be removed and/or capped To achieve closure of this unit, a selection of one of two options will be made by DOE/Kaiser-Hill based on characterization data See Option 1 in Section 8 1 and Option 2 in Section 8 2 below

8.1 OPTION 1: DECONTAMINATION OF BELOW GROUND PORTIONS OF RCRA UNIT 40 ASSOCIATED WITH BUILDING 123

The below ground portion of this unit will be decontaminated in accordance with the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, including Section C, Clean Closure by Decontamination

Requirements identified in this section include, but are not limited to, the selection of an appropriate solution for decontamination Selection of this solution was based on the types of wastes previously managed in the unit and the contaminants that are present Water containing sodium carbonate and trisodium phosphate will be used as decontamination solution The system will be flushed with the decontamination solution to remove any remaining trace amounts of acids or bases The final rinsate closure performance standards for internal surfaces of tanks (as described in RFCA Permit, Part X Closures) will be used to evaluate the effectiveness of the decontamination The final rinsate volume will not exceed 5% of the capacity of the piping system

This interim status unit will be considered decontaminated if

- All visible waste residuals have been removed and,
- The final rinsate contains concentrations of priority pollutants (identified as being managed in the unit) and heavy metals (268 48 UHC listing) below the Tier 2 action levels as defined in Attachment 5 of the Rocky Flats Compliance Agreement (RFCA) and,
- The pH of the rinsate is between 6 and 9

8 1.1 If Rinsate Meets Performance Standards

Once the rinsate solution meets the performance standards, as identified above, the soil sampling program approved in the 123 PAM will be initiated If the soil contamination is above levels defined in Section 261 Subpart C, the pipeline will be removed as part of the soil remediation program If the soil contamination is below Section 261 Subpart C levels the lines will be grouted and capped in place Any remaining soil contaminants will be evaluated as part of the 123 PAM and/or final Record of Decision (ROD) for the facility

8 2 OPTION 2: MANAGED AS HAZARDOUS WASTE WITH NO ON-SITE TREATMENT

8.2.1 If Rinsate Fails to Meet Performance Standards Manage Piping and Rinsate as Hazardous Waste

If the rinsate is above the Tier 2 levels, the rinsate will be sent to Building 374 for treatment The pipelines will be removed and characterized in accordance with 6 CCR 1007 3, Section 262 11 The final Hazardous and/or mixed wastes will be stored on-site in approved TSDFs waiting for final disposal in an authorized off-site TSDF

Hazardous and/or mixed waste generated from this project may be stored on-site in TSDFs until shipment to an off-site TSDF for final disposition All hazardous waste and/or mixed wastes generated from this project will be managed in accordance with all applicable state and federal regulations Further description of waste management activities can be found in Section 10

9.0 SPECIFIC CLOSURE ACTIVITIES

Closure activities will be performed to achieve the objectives of the closure performance standard (See RCRA Permit, Part 10 Closure, Section C-6, "Closure Performance Standards") The activities will be conducted with decontamination and decommissioning activities covered by the Building 123 PAM, which includes remediation of the remainder of the building and abandoned OPWLs under the building Closure activities will be implemented to ensure the protection of human health and the environment, and waste minimization

The following sections outline the procedures necessary to close active process waste lines in Building 123, and the active underground line between Building 123 and Valve Vault 18

9.1 PREPARATION OF ENGINEERING PACKAGES AND WORK PACKAGES

Engineering and work packages will be used to govern the deactivation and decommissioning activities Engineering designs will be developed for removal and decommissioning activities The engineering package will define the sequence of activities and methods of size reducing, dismantling, and packaging of the building materials The packages are being prepared for the Building 123 project in three phases

1) Deactivation of the building,

2) Demolition of the building,

3) Remediation of underground contamination and/or closure of the underground pipeline as required

The RCRA Unit 40 system located in the building as described in an earlier section will be covered by the Deactivation and Demolition packages (Building 123 PAM, Section 2, 3 1, RCRA Unit 40) Remediation and stabilization will be accomplished by the remediation and closure package

9 2 HEALTH AND SAFETY

The RFETS Health and Safety Practices Manual defines general health and safety measures to be followed at the Site All closure activities will be conducted in accordance with the manual In addition, a specific Health and Safety Plan has been written for Building 123 D&D activities, which specifically addresses D&D and RCRA Unit 40 closure activities As Low As Reasonably Achievable (ALARA) principles will be followed regarding personnel radiation dosage and exposures to hazardous materials Radiation Control Technicians will survey all rooms in the building for radiation, and the pipelines and sumps will be monitored for radiological contamination

In accordance with Site procedure 1-74000-IWCP, September 4, 1996, Integrated Work Control Program (IWCP) work packages will be prepared to direct and control all work The packages will be organized similarly to the engineering packages Each work package will contain a Job Safety Analysis (JSA), which addresses all health and safety issues in detail

9 3 TANK SYSTEM CLOSURE ACTIVITIES

9 3 1 Closure of System Components

Preliminary work consisting of removing and characterizing the above ground portion of the piping system will commence as soon as the building is evacuated Closure of the underground lines is dependent upon the amount of contamination (if any) discovered in the final characterization The below ground pipeline will meet either the rinsate standards (Option 1) or will be removed, characterized and managed in accordance with all applicable rules and regulations (Option 2)

The WSRIC system documents that the process waste system in Building 123 has only been used as an elementary neutralization unit The majority of the discarded liquids were acids and bases According to the WSRIC data, no listed wastes were disposed in the system since the 1989 replacement of the aboveground portions of this unit

Closure of this system will be done as follows

- Preliminary Work The above ground portion will be removed and characterized as a preliminary step All solid and hazardous waste will be managed in accordance with all applicable state and federal rules and regulations Hazardous waste will be stored on-site in authorized TSDFs awaiting final disposition

- Below ground portions of this unit will be decontaminated using a solution of water and sodium carbonate and trisodium phosphate The rinsate will be tested to determine if it meets the Tier 2 levels identified in Attachment 5 of RFCA If the rinsate meets these standards the below ground portion of this unit will be considered closed If the rinsate is above the standards, the pipe will be excavated and characterized Characterization will determine if the pipeline is managed as hazardous/mixed waste or low level waste If soil contamination is present that requires removal/remediation, the pipeline will be removed at that time as part of the soil remediation

9.3.2 Closure Scenarios Associated with Soil Contamination

The choice of closure activities for underground pipelines will be influenced by the extent of hazardous contamination, found in soil sampled near the pipeline One or more sets of activities will be pursued, based upon the amount of RCRA regulated contaminants that are found

1 Contamination above RCRA levels, Subpart C, 261 levels

Soil surrounding the pipelines contaminated above RCRA, Subpart C, 261 levels will require thorough decontamination, including removal of the contaminated soil and pipeline Soil contaminated above RCRA regulated levels will be removed and managed as hazardous waste

If sampling shows an extensive contamination plume in the soil, other management options such as soil vapor extraction, thermal drying, or on site stabilization may be pursued upon agreement with CDPHE personnel If any these options are necessary, an addendum to this closure plan will be submitted

2 Contamination below RFCA levels, below Tier 2 levels

If analytical results indicate that the soil is below RFCA Tier 2 levels, the following actions will be taken Underground pipelines will be filled with grout, capped and left in place

3 Contamination below RCRA Subpart C, 261 levels, and above RFCA Tier 2

If analytical results indicate that the soil is below RCRA Subpart C, 261 levels, but above the RFCA Tier 2 levels, the following actions will be taken Underground lines will be filled with grout, capped, and left in place Soil will be left undisturbed As part of the RFCA Plant Closure, a risk assessment will be conducted Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document

10.0 DISPOSITION OF WASTE GENERATED DURING CLOSURE

Remediation and closure activities may generate a combination of radioactive, hazardous, and mixed wastes Contaminated soil and pipeline material are expected to be the major sources of waste Wastes consisting of plastic, tools, personal protective equipment and other materials associated with demolition and remediation will also be a major source of waste. Contaminated waste will be handled by qualified waste packaging technicians who will work with decontamination specialists and radiation control technicians to identify and segregate the Hazardous or Low Level waste Waste packaging technicians will package and label the waste, and will arrange for radioactive waste to be certified Liquid hazardous or radioactive waste generated after the process waste lines are no longer in service will be collected in drums and shipped to Building 374 for processing Solid waste in drums or boxes will be managed by the Waste Disposal group in an appropriate storage area prior to off-site shipment

10.1 ESTIMATE OF WASTE VOLUMES TO BE GENERATED

Table 10-1 describes the types, estimated quantities of waste to be generated, and how the waste will be handled and disposed

Table 10-1 Estimated Volume of Waste to be Generated

Waste Forms	Waste Type	Disposition of Waste	Estimated Quantity
Option 1			
Process waste pipelines	Low Level	LLW will be recycled at SEG, Oak Ridge, TN or sent to the Nevada Test Site	100-200 Cubic Ft
Plastic, paper, etc decontamination or LLW handling	Low Level	Nevada Test Site	100-200 Cubic Ft
Option 2			
Process waste pipeline	Low Level Mixed	Envirocare or other approved TSDF	100-200 Cubic Ft
Plastic, paper, etc	Low Level	Nevada Test Site	100-200 Cubic Ft
Remediation of underground pipelines, soil, plastic, paper, tools, etc	Low Level Mixed	Mixed Waste will be stored on-site in a TSDF awaiting shipment to Envirocare or another approved TSDF	Up to 2100 Cubic Ft (Waste will be generated only if contamination indicates need to exhume pipeline)

11.0 RECORD KEEPING

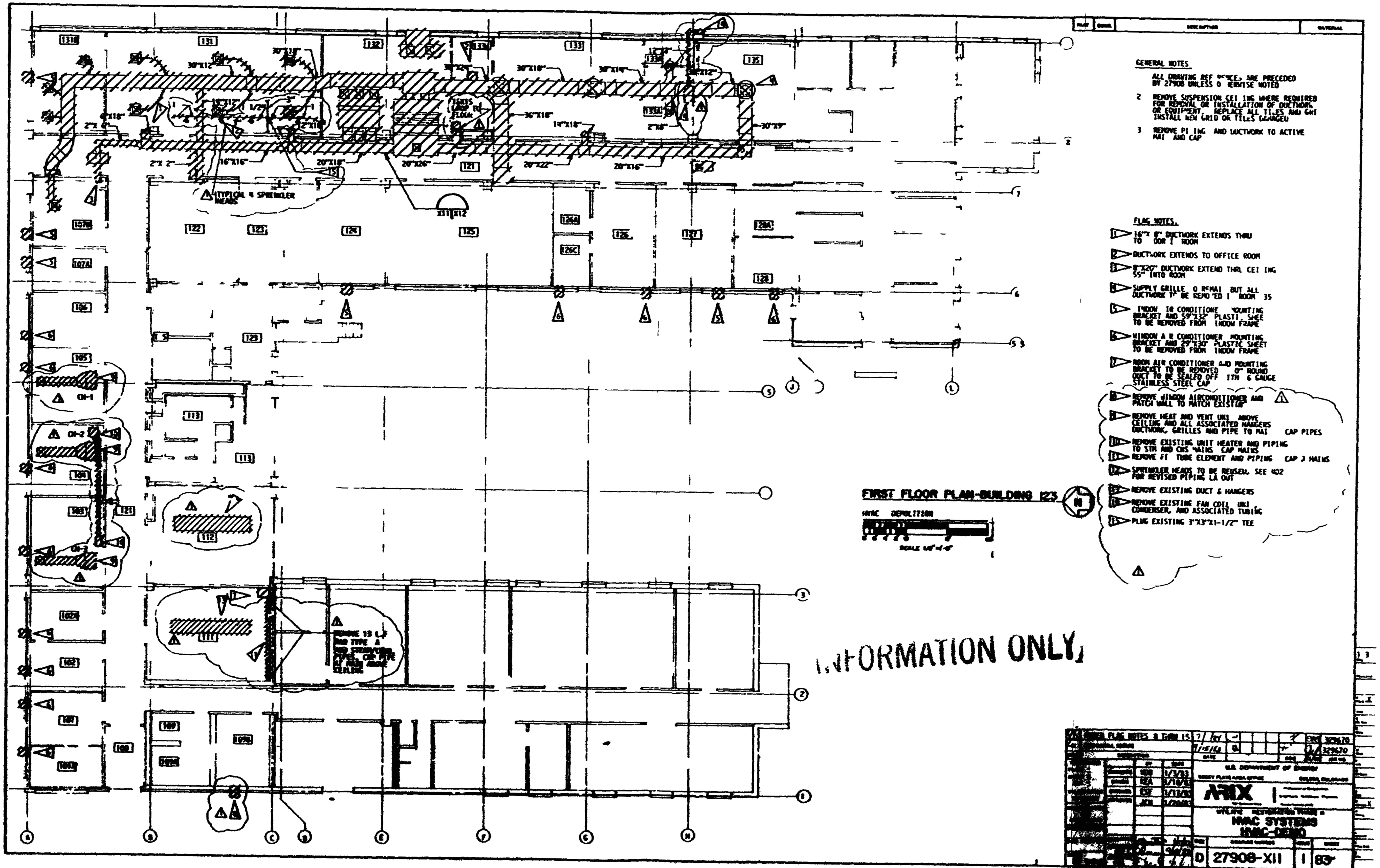
The following closure documentation will be maintained

- A field logbook indicating the date, number, and type of sampling activities
- Analytical results
- Records of actions taken to decontaminate equipment or structures
- Work control packages developed to govern closure activities

Certification and other documentation indicating that closure was conducted in accordance with the closure plan

Appendix A

First Floor Plan


GENERAL NOTES
ALL DRAWING REF ...CE, ARE PRECEDED BY 27908 UNLESS O ...ERWISE NOTED
2 REMOVE SUSPENSION CEI ING WHERE REQUIRED FOR REMOVAL OR INSTALLATION OF DUCTWORK OR EQUIPMENT. REPLACE ALL TILES AND GRI INSTALL NEW GRID OR TILES DAMAGED
3 REMOVE PI ING AND DUCTWORK TO ACTIVE MAI AND CAP
FLAG NOTES.
1 16"X 8" DUCTWORK EXTENDS THRU TO OOR I ROOM
2 DUCTWORK EXTENDS TO OFFICE ROOM
3 8"X20" DUCTWORK EXTEND THRU CEI ING 55" INTO ROOM
4 SUPPLY GRILLE O REMAI BUT ALL DUCTWORK TO BE REMOVED I ROOM 35
5 INDOW IR CONDITIONE MOUNTING BRACKET AND 59"X32" PLASTI SHEE TO BE REMOVED FROM INDOW FRAME
6 WINDOW A R CONDITIONER MOUNTING BRACKET AND 29"X30" PLASTIC SHEET TO BE REMOVED FROM INDOW FRAME
7 ROOM AIR CONDITIONER AND MOUNTING BRACKET TO BE REMOVED 0" ROUND DUCT TO BE SEALED OFF ITH 6 GAUGE STAINLESS STEEL CAP
8 REMOVE WINDOW AIRCONDITIONER AND PATCH WALL TO MATCH EXISTING
9 REMOVE HEAT AND VENT UNIT ABOVE CEILING AND ALL ASSOCIATED HANGERS DUCTWORK, GRILLES AND PIPE TO MAI CAP PIPES
10 REMOVE EXISTING UNIT HEATER AND PIPING TO STM AND CHS MAINS CAP MAINS
11 REMOVE FI TUBE ELEMENT AND PIPING CAP 2 MAINS
12 SPRINKLER HEADS TO BE REUSED. SEE 402 FOR REVISED PIPING LA OUT
13 REMOVE EXISTING DUCT & HANGERS
14 REMOVE EXISTING FAN COIL UNI CONDENSER, AND ASSOCIATED TUBING
15 PLUG EXISTING 3"X3"X1-1/2" TEE
FIRST FLOOR PLAN-BUILDING 123
HVAC DEMOLITION
TYPICAL 4 SPRINKLER HEADS
30"X12"
30"X18"
30"X14"
30"X9"
36"X18"
14"X18"
20"X26"
20"X22"
20"X16"
20"X18"
16"X16"
131
131B
132
133
133A
133B
135
121
122
123
124
125
126
126A
126C
127
128
128A
113
112
111
107A
107B
106
105
102
102A
101
101A
100
109
109A
109B
OH-1
OH-2
INFORMATION ONLY
U.S. DEPARTMENT OF ENERGY
ARIX
HVAC SYSTEMS
HVAC-DEMO
D
27908-XII
1
83